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Directions in Geoheritage Studies: Suggestions from the Italian Geomorphological Community

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Abstract

In recent years, more and more attention has been focused on geological and geomorphological heritage. This has led to several investigations within the framework of conservation projects, both at administrative and scientific levels, involving national and international research groups whose purposes are the promotion of Earth Sciences knowledge and the conservation of geological heritage. This paper presents an overview of research and conservation projects in Italy, focusing mainly on geomorphological heritage. Members of the AIGeo Working Group on "Geomorphosites and cultural landscape" analysed the historical development of these research projects in order to identify possible innovation strategies to improve the awareness and knowledge of geodiversity and geoheritage of a wider public.

Keywords

Italy • Geoheritage • Geomorphosites • Geotourism • Geodiversity

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34.1 Historical Development

The attention of researchers has focused primarily on the inventory and assessment of sites of geological and particularly geomorphological interest—Geosites—in order to emphasise not only their scientific values but also their cultural and landscape contexts, as a support for particular biological and historic-architectonic assets. Researchers from various Italian Universities were involved in national and international projects. Within these projects, a common methodological approach for the survey, selection, cataloguing, assessment and appraisal of Geomorphological Sites was set up. This method was compared at an international level and tested in different areas.

The term "Geomorphosite", introduced by Panizza 2001, synthesizes the interest for the heritage value of geomorphology and its relationships with human heritage. The complex and often close connection that can exist between Geoheritage, human history and cultural heritage, led to several scientific initiatives both at international and national level. Increasing interest in geomorphological heritage has inspired diverse projects, often in collaboration with the

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local administrations. The recent inclusion of the Dolomites in the UNESCO World Heritage list is one of the main results of research on geomorphological heritage assessment and a new approach in geodiversity studies.

34.2 Research Lines and Methodological Issue

At an international level, many Italian researchers have been involved in studies carried out by the Working Group "Geomorphological sites" of the International Association of Geomorphologists (IAG). The Working Group was created during the 5th International Conference on Geomorphology held in Tokyo in 2001 with the aim to improve knowledge and scientific research on the definition, assessment, mapping, promotion and conservation of geomorphological heritage. During these 12 years of activities many improvements in the field of Geomorphosite research have been achieved (Reynard and Coratza 2013); nevertheless, several questions have not yet been solved and should be addressed in the future. In particular the WG decided to focus its future activities on the following new themes: (1) geomorphosites as key sites for environmental education; (2) the study of dynamic and sensitive geomorphosites; (3) the relationships between geoheritage and geodiversity.

The latter issue will be addressed in collaboration with the new WG "Geodiversity".

In Italy numerous projects of research have been implemented and are under development:

- Improvements in field data collection and visual representation of landforms have led to new elements in geomorphological mapping (Carton et al. 2005; Coratza and Regolini-Bissig 2009). Applications of these new methodologies were improved by several research units. Among these, interesting proposals have been carried out by La Sapienza University of Rome, concerning geosite inventory in urban areas, also for urban geotourism proposals (Del Monte et al. 2013). Previous studies in the city of Rome have allowed geomorphosites, still recognizable in an intensely urbanized context, to be properly appraised. In order to disseminate scientific knowledge a geosite evaluation model has been developed. A further step concerns the implementation of a map containing essential scientific and cultural information (Fig. 34.1). The long tradition of geoheritage assessment carried out by Modena University researchers has dealt with the development of methodologies and tools for assessing the relationships between physical landscapes and quality of the environment (Panizza and Piacente 2003; Coratza and Giusti 2005; Piacente and Coratza 2005). This has led to the elaboration of applied methodologies dedicated to facing problems concerning the transfer of scientific knowledge to end-users or local communities. Several geotourism initiatives have been carried out following agreements with local boards (Coratza et al. 2004; Castaldini et al. 2011).
- Geomorphological and geological heritage is analysed with a special focus on its relationships with cultural landscape and human history. With this aim, the Sannio University research unit focuses its studies on the relationships between the geological and geomorphological heritage of Irpinia and its historical and cultural landscape (Cartojan et al. 2011). Here geology and geomorphology interacted strongly with the social, economic and religious life of the local population. The willingness of the population to recover the landscapes of their memories has led to a profitable appraisal and clever promotion of the local geosites through the offer of naturalistic and cultural itineraries (Russo and Sisto 2012).
- Researches have been carried out on monitoring evolution rates of active geomorphosites in different morphoclimatic contexts (Reynard 2004), in order to evaluate risk scenarios in the context of tourism. The research group of Milan University has been working on active geomorphosites and variations of geomorphological processes: it is fundamental for forecasting evolutionary scenarios, especially regarding hazards and impacts on natural and cultural assets. The problem of dealing with active geomorphosites is twofold (Fig. 34.2): (a) changes in geomorphological processes may directly influence the value of sites of geomorphological interest; (b) active geomorphological processes may represent natural hazards and be a source of risk where tourist trails are present. Researches on active geomorphosites are in progress. Educational exemplarity and accessibility of active geomorphosites under investigation will allow the research results to be disseminated to the general public, with a further application for education regarding risk. For this reason, a methodology for mapping the hazards along tourist trails in relation to geotourism has been proposed for various sites of the Alps (Pelfini et al. 2009; Bollati et al. 2013).

  Within the framework of assessing geomorphosites and their tourism potential, a new field of research is being carried out by the Sassari research unit, focusing on sites used for outdoor activities like free climbing or canyoning, or for active tourism in general. In particular, concerning climbing, a method of assessment was designed and tested on a number of important Italian climbing sites. As is often the case of leisure sports activities, the geomorphological resource is often the main motivation for destination choice. It is therefore advisable not to ignore the possible risks linked to the

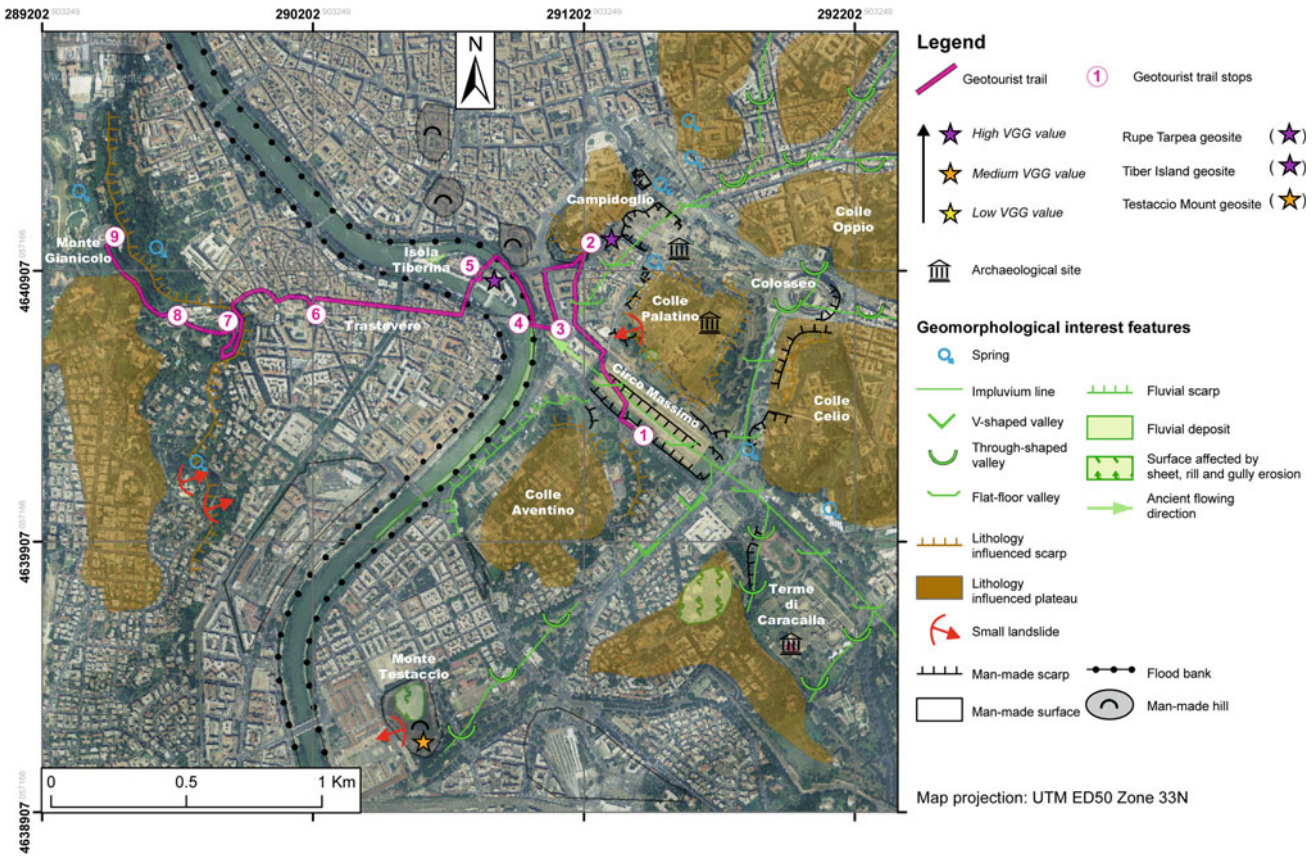

Fig. 34.1 Geotourism map of Rome city centre. Only the essential scientific information is shown on the map

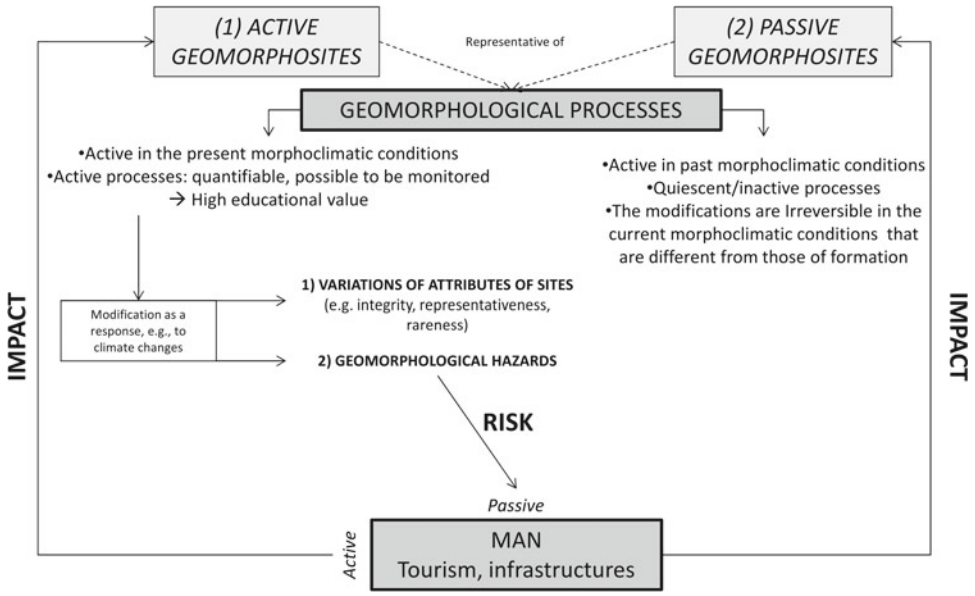

Fig. 34.2 Typologies of geomorphosites according to their activity in present morphoclimatic conditions

dynamic nature of the environment in which these activities take place (Panizza and Manca 2006; Panizza and Mennella 2007).

- In order to provide a bridge between cultural heritage and potential geoheritage, a geoarchaeological approach is suggested by the geoarchaeologists working unit from Milan University. From the methodological viewpoint, the geomorphologist/geoarchaeologist is asked to accomplish the geomorphological survey of an area where an archaeological/historical site is located (Panizza

and Piacente 2003). Integrated fruition of cultural and geomorphological heritage can be suggested by the creation of geo-archaeological pathways which may help users to understand the complexity of the geological landscape surrounding an archaeological/historical site and the ways in which humans and the environment have interacted in the past. A further step should be taken concerning the preservation of cultural heritage when considering active geomorphosites. In fact, in dynamic geomorphological contexts cultural heritage may suffer heavy threats and even complete destruction: various ongoing projects concerning the simultaneous enhancement of cultural and geomorphological heritage have been developed in diverse Italian and African regions (Biagetti et al. 2013). In the arid environment of North Africa, studies aim to combine the archaeological evidence with geomorphosites, in order to provide a way of increasing the tourist potential of the region, and to select areas that could be proposed for conversion into natural parks.

- Relationships between geomorphological heritage and parks are undergoing comprehensive development, including the proposal of interdisciplinary attractions such as geoarcheological parks, mining and other georesources theme parks. The research unit of Pavia University, for instance, focused its studies on mining heritage. The persistence over time of mining villages and mining plants is a significant example of the influence of mining activities on land use and the natural landscape. As mining sites are abandoned, they deteriorate rapidly and are subject to recolonization by natural elements. Over the past two decades in some European countries, including Italy, the recovery of old mines has become more frequent, both in the Alps and in other regions (Laureti 2011). The results of investigations carried out on abandoned and deactivated mines in the provinces of Lecco, Bergamo and Brescia, led to the Lombardy Region issuing a law in 2009, which sets out the rules for the recovery and reuse of old mines.

34.3 New Directions

Although studies on geomorphological heritage share the same conceptual foundations and have common development stages, the various research groups followed several methodological approaches and lines of development. This diversity is in part due to the multiplicity of geographical contexts and application areas of research. In one sentence we can say this is part of the high geodiversity of Italy.

Many innovative themes can be outlined for the next developments in geoheritage assessment, geoconservation issues and geotourism activities including:

- The social role of geological and geomorphological studies, according to a modern "geoethical vision" of the application of Science. The "Section on Geoethics and Geological Culture" was established in 2013 as a branch of the Italian Geological Society, thanks to experiences within the framework of the Italian Commission on Geoethics and to the contributions of individual researchers. It is also the Italian representative of the IAPG—International Association for Promoting Geoethics. The section provides a scientific and multidisciplinary platform aiming to promote debates on ethical problems applied to Geosciences, as well as studying and deliberating on the values of geological culture (Matteucci et al. 2012). By means of a systemic and functional approach, research can be developed towards a cultural type of geology capable of reconstructing the "historical map" of specific sites. In this way the "geological site" becomes the "place" above all others. Thus, one of the main goals of our disciplines is achieved: the implementation of "Social Geology" able to respond to the needs of the general public and increase the level of knowledge and responsibility at the same time (Panizza and Piacente 2003).
- With particular reference to Geomorphology, Panizza (2009) introduced the concept of Geomorphodiversity: "the critical and specific assessment of the geological features of a territory, by comparing them in a way both extrinsic and intrinsic and taking into account the level of their scientific quality, the scale of investigation and the purpose of the research". A discussion about Geodiversity should start off from these grounds and remarks, also in order to avoid conceptual misunderstandings or drifting away towards fruitless schematizations.

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